# *Geo-Targeted Alerting System (GTAS)*

# Evaluation Plan

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NOAA/OAR/ESRL
Global Systems Division
Information Systems Branch
Boulder, CO

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# 1. Introduction

The Department of Homeland Security (DHS) is funding the Global Systems Division (GSD) to conduct a Geo-Targeted Alerting System (GTAS) Pilot Project to determine how advanced high-resolution meteorological and toxic plume data can be used for emergency preparedness. GTAS is built around a display system that allows users to predict plume dispersion in a weather context, outline areas that require warning, and coordinate the specification and issuance of those warnings between weather forecasters and emergency operations officials. The goal of this project is to use NOAA's numerical modeling data, high performance computing, and warning infrastructure to provide *geo-targeted* safety information to specific city neighborhoods that are under a life-threatening condition.

This Evaluation plan describes the tasks necessary to evaluate the different components of the GTAS system and to determine how efficiently these components are used by the NWS Weather Forecast Office (WFO) forecasters and Emergency Operations Center (EOC) emergency managers during operations.

This year the GTAS Pilot Project will involve the cities of Melbourne, FL, Lake Charles, LA, and Houston, TX, as noted below in the following table.

| **Location** | NWS Regional Office | WFO | State EOC | Local EOC | NOAA |
|---|---|---|---|---|---|
| Melbourne, FL | | X | X | X | |
| Lake Charles, LA | | X | X | X | |
| Houston, TX | | X | X | X | |

Each of the WFO and EOC sites will host a GTAS Client (see Figure 1 below). A GTAS Server (see Figure 1 below) will be installed at each of the NWS Regional Offices. Each of these systems will be evaluated.

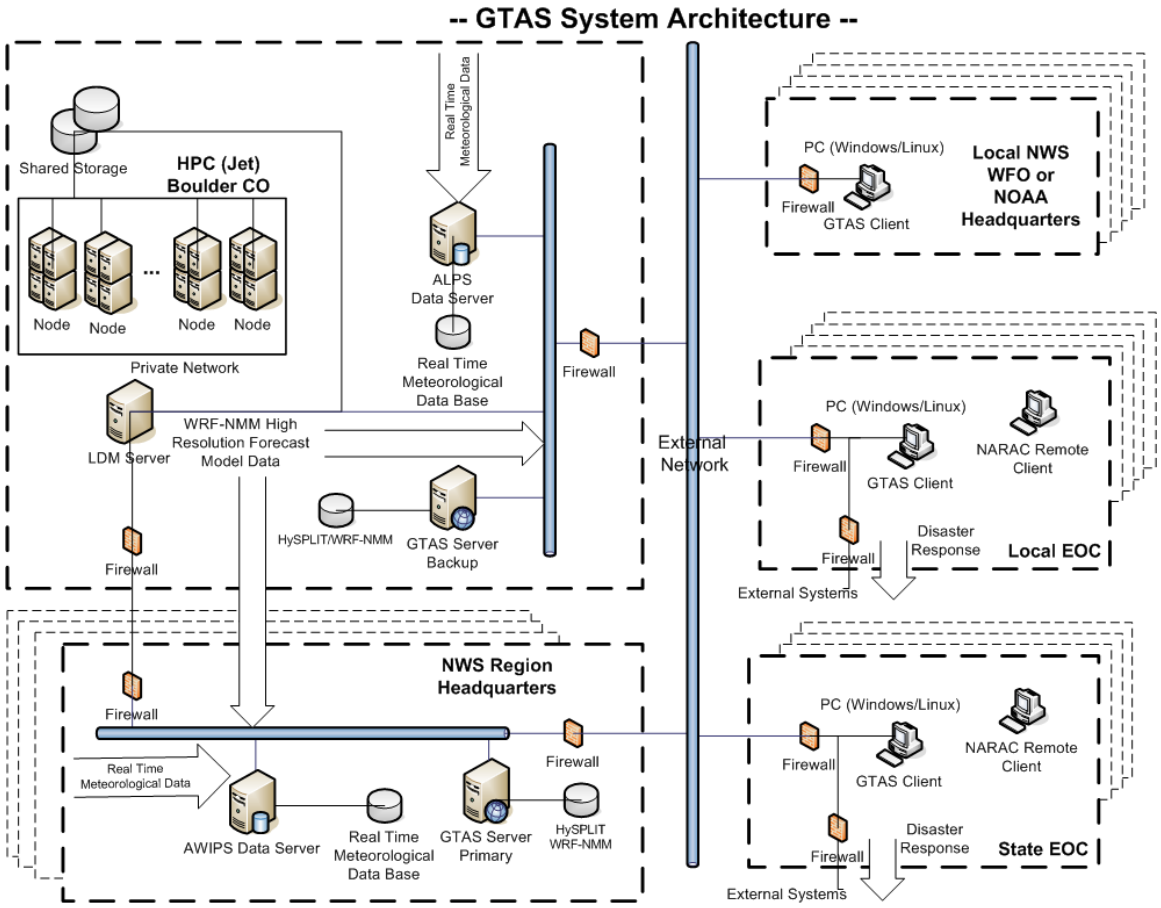


**Figure 1: GTAS System Architecture**

## 2. Objectives

The purpose of the Evaluation Plan is to:

1. Verify the GTAS system is operationally ready by ensuring that each component meets the GTAS system requirements and operates as expected.
2. Verify that the FEMA requirements to provide air dispersion and toxic plume information along with NOAA's meteorological data to state and local emergency management offices are being met.
3. Ensure through user feedback that the GTAS system is disseminating vital data to Emergency Managers in a quick, detailed, and user-friendly way while also enhancing established relationships between the WFOs and EOCs.

# 3. GTAS System Evaluation

The goal of this evaluation is to verify that the GTAS system is operationally ready by ensuring that each component meets the GTAS system requirements and operates as expected. Evaluation will be performed at GSD before deployment and again immediately after each site installation.

The diagram below illustrates the components of GTAS, which need to be evaluated.

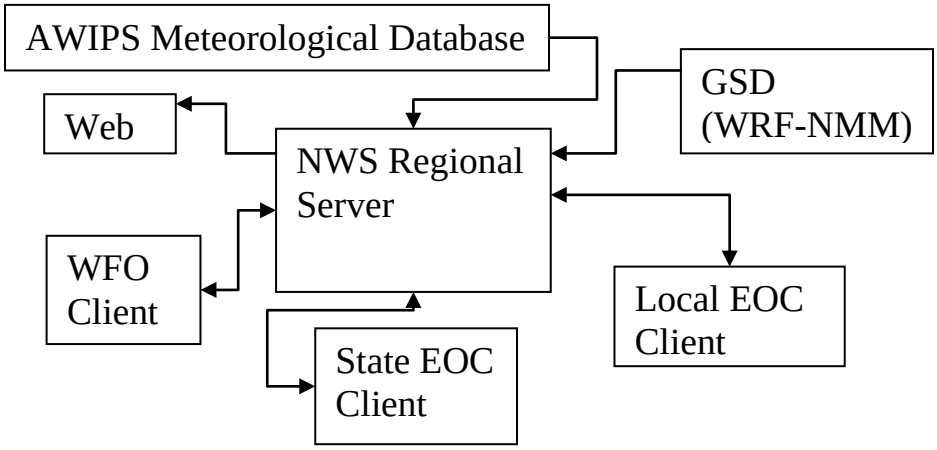


**Figure 2: System Evaluation Diagram**

## *3.1 NWS Regional Server Evaluation*

The following table is a list of the evaluation procedures that need to be performed to ensure the server is operating and ingesting data properly.

| **GTAS Server Evaluation** | NWS Regional Server (Y/N) |
|---|---|
| Is the AWIPS meteorological database accessible? | |
| Is real-time WRF-NMM Model data being ingested? | |
| Is the GTAS server running and setup to accept remote connections from the GTAS clients collaboratively and independently? | |

## *3.2 GTAS Client Evaluation*

The GTAS Client is an application that allows its users access to the Advanced Weather Information Processing System (AWIPS) meteorological database, the Geographic Information Systems (GIS) map displays, the HySPLIT dispersion model, collaboration tools, drawing tools, among other functionality.

The following tables represent the different components of the GTAS client user interface functionality and what will be evaluated.

| **Evaluation Area**<br>***AWIPS Meteorological Database*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can communicate with the Server independently and collaboratively? | | | |
| Can display the following real-time WRF-NMM Model data? | | | |
| • *Temperature* | | | |
| • *Wind* | | | |
| • *Relative Humidity (RH)* | | | |
| • *Precipitation* | | | |
| • *Surface Pressure ($P_{SFC}$)* | | | |
| Can display the following Surface data? | | | |
| • *METAR Station Plot* | | | |
| • *MADIS Station Plot* | | | |
| Can display Upper Air Plots and RAOBs? | | | |
| Can display the following Satellite data? | | | |
| • *Visible* | | | |
| • *IR Window* | | | |
| • *Water Vapor* | | | |
| Can display Local Radar data? | | | |
| Can display National Radar data? | | | |

| **Evaluation Area**<br>***GIS Map Displays*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can display high resolution Topography Map images? | | | |
| Can display detailed transportation data? | | | |

| | | | |
|---|---|---|---|
| Can display detailed building structures, i.e. Hospitals, Schools, etc.? | | | |
| Can modify shape file information and displays using the Shape File Database Tool? | | | |

| **Evaluation Area**<br>***HySPLIT Dispersion Model*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can display the user interface of the HySPLIT Dispersion Model ? | | | |
| Can select the following functionality through the HySPLIT user interface? | | | |
| • *Chemical Release Type* | | | |
| • *Duration of Release* | | | |
| • *Altitude of Release* | | | |
| • *Time of Release* | | | |
| • *Amount of Release* | | | |
| • *Location of Release* | | | |
| • *Length of Model Run* | | | |
| Can display the HySPLIT Dispersion Model Plume? | | | |
| Can loop the HySPLIT Dispersion Model display? | | | |
| Can create warning polygons using drawing tools within the display? | | | |

| **Evaluation Area**<br>***Other Functionality*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can do the following to Procedures? | | | |
| • *Create Procedures* | | | |
| • *Modify Procedures* | | | |
| • *Save Procedures* | | | |
| • *Delete Procedures* | | | |
| Can do the following to Slide Shows? | | | |
| • *Create Slide Show* | | | |
| • *View Slide Show* | | | |
| • *Save Slide Show* | | | |
| • *Delete Slide Show* | | | |
| Auto-update is activated and operates as expected? | | | |
| Can turn looping on and off? | | | |
| Can display Baselines? | | | |
| Can display Points? | | | |

| | | | |
|---|---|---|---|
| Can combine images? | | | |

| **Evaluation Area**<br>***Collaboration Tool*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can communicate with the Server? | | | |
| Can share meteorological weather data displays? | | | |
| Can communicate using Text Chat? | | | |
| Can share HySPLIT Model output? | | | |
| Can share drawings? | | | |

| **Evaluation Area**<br>***Drawing Tool*** | WFO Client (Y/N) | Local EOC Client (Y/N) | State EOC Client (Y/N) |
|---|---|---|---|
| Can activate the Drawing Tool? | | | |
| Can select and display Symbols and Line Types using the Drawing Toolbar? | | | |
| Can create CAP messages and XML Schema? | | | |
| Can send CAP messages and images to the Web? | | | |
| Can change the Drawing Tool edit state in the display Legend? | | | |

# 4. Evaluation Methods

The GTAS system will be evaluated to determine if:

- GTAS meets the FEMA requirements to provide air dispersion and toxic plume information along with NOAA's meteorological data to state and local emergency management agencies?
- GTAS enables the NWS and local/state EOCs to predict the dispersion of a wide variety of airborne substances?
- GTAS enhances the already established relationships between the WFOs and EOCs?
- GTAS disseminates vital data to Emergency Managers in a quick, detailed, and user-friendly way in order to assist in the creation of their mitigation and response plans?

The evaluation methods used to evaluate the GTAS system will include the following:

- *Online Questionnaires* – available online through the GTAS website, http://fxc.noaa.gov/GTAS/

- *Interviews*
- *Exercise Scenarios and Observations* - GSD will observe and evaluate how users are using GTAS operationally during a simulated hazard emergency.
- *System Logs* – available continuously and allows GSD to observe the GTAS system operationally and monitor performance.

# 5. Facility & System Requirements

The facility and system requirements assumes that the sites have been selected and have agreed to participate in GTAS, the server and client systems for each site have been identified and meet GTAS requirements, and that the firewall issues have been resolved. Evaluation will begin at each site immediately following GTAS software installation.

All evaluation preparations will be completed at GSD by staff in Boulder, CO. This activity will require two workstations connected to a GTAS (development) server at Boulder. The hardware configuration will be as similar as possible to the fielded systems. The same hardware complement can also be used to demonstrate the system to management and visitors.

# 6. Personnel Requirements

The successful conduct of the Evaluation Plan requires that the facilities and systems are functioning properly, and the evaluation material is ready. It also requires the support and participation of the following staff:

*Evaluation Staff*
The evaluation staff will consist of one to three GSD personnel at a time at each location. The staff will be intimately familiar with the GTAS system user interface functionality presented at each site.

# 7. Schedule

The evaluation process identified above will be continuous throughout the training sessions, please refer to the GTAS Training Plan for more scheduling information and flow of conduct.

# 8. Evaluation Results and Report Preparation

The results from the Evaluation will be continuously collected and compiled throughout the GTAS Pilot Project. Relevant information will be passed on to the GTAS Team in order to keep them apprised of the evaluation progress and to determine whether additional information needs to be provided by the participants. Up to two documents will be generated:

1. A data catalogue with all of the feedback and logs from the evaluation.
2. A report summarizing the evaluation overall results along with findings and recommendations for future GTAS developments and evaluations.